REMARKS

Applicant respectfully requests reconsideration in view of the amendment to claim 5 and the following remarks.

Applicant amended claim 5 to a tantalum nitride removal rate of at least "eighty" percent of copper removal rate at a pad pressure of 13.8 kPa. The specification at paragraph 34 lines 1 to 4 provides a basis for the amendment. Applicant respectfully submits that the amendment enters no new matter.

For reference purposes, this response continues to break out Sun et al. into three distinct slurries as follows: (1) the description of bulk slurry of Sun et al. into Col. 6, line 33 to Col. 7, line 19; (2) first copper CMP slurry at Col. 7, line 20 to Col. 8, line 39; and (3) a second barrier CMP slurry of Col. 8, line 40 to Col. 9, line 65. Applicant submits that this represents an accurate characterization of Sun et al. to those skilled in the art of slurry design and slurry use for chemical mechanical polishing.

The action rejects claims 1 to 7 under 35 U.S.C. § 103(a) as being unpatentable over Sun et al. (US Pat. No. 6,709,316) in view of Sherber et al. (US Pat. No. 5,858,813) as evidenced by Changzhou Kejia Chemical Co. (Product Detail Poly (Maleic Acid)) and Wikipedia; Maleic Acid. Sun fails to disclose the claimed water soluble polymaleic acid of the invention. In summary, this combination combines a bulk copper slurry (Sun et al.), a first copper CMP slurry (Sun et al.), a second-step barrier slurry (Sun et al.), a metal film slurry (Scherber et al.) and polymer literature to string together the rejection as follows:

1) Bulk copper slurry—Col. 7, lines 9 to 12 (*abrasive*), Col. 6, lines 57 to 59 (*oxidizer*), Col. 6, lines 59 to 65 (*benzotriazole inhibitor*), Col. 6, line 66, Col. 7, lines 1 to 3 and Col. 7, lines 3 to 4 of Sun et al. (*inorganic and/or organic acids—phosporic acid*).
2) First copper CMP slurry--Col. 7, line 59 of Sun et al. (*phosphoric/nitric acid*).
3) Barrier slurry selectivity for tantalum—Col. 3, lines 32 to 34 of Sun et al. (*barrier selectivity*)
4) Optional organic acid genus of *maleic acid derivatives*—Col. 5, lines 43 to 54 of Scherber et al.
5) *Polymaleic acid* from product literature.

Applicant respectfully submits that since there is no motivation for one skilled in the art to combine these four slurry formulations with polymer literature to create the claimed barrier slurry, the combination fails to establish a prima facie case of obviousness. First, the Sun et al. reference describes a bulk copper slurry at Col. 6, line 33 to Col. 7, line 19 and a first copper CMP slurry at Col. 7, line 20 to Col. 8, line 39 [the first copper CMP slurry includes a reducing agent and is not relevant to the current barrier slurry that includes an oxidizing agent.] and a second barrier CMP slurry at Col. 8, line 40 to Col. 9, line 65. The action combines the ingredients and pH range from the bulk copper slurry with the first copper CMP slurry and barrier slurry to reject the claimed barrier slurry of the invention. As previously stated in the earlier-provided Declaration of Dr. Liu, because first-step or bulk copper slurries operate to remove copper at high rates with low barrier removal rates, they teach away from the use of a barrier removal slurry. Furthermore, the reference of Sun et al. does not disclose a second step barrier removal slurry that operates at a pH below 4—Sun et al. disclose a pH of 4 to 12 at Col. 8, line 66 to Col 9, line 6. In fact the prophetic-type barrier slurry Example of Sun et al. operates

with a preferred basic pH of 8 to 12. This also teaches away from the acidic barrier slurry of the invention. In summary, because the pH ranges between copper and barrier slurries are different and the preferred barrier pH range teaches away, the action has not provided any motivation to combine an acidic pH feature of a copper slurry with a barrier slurry optimized at basic pH levels.

After the selective combining a bulk copper slurry with the first copper CMP slurry and barrier slurry of Sun et al., the rejection combines the (1) bulk copper, (2) first copper CMP and (3) barrier slurries of Sun et al. with a complexing agent genus (4) from the metal film polishing composition of Scherber et al.--Examples directed to aluminum polishing. In particular, the action combines the bulk copper and barrier slurries with the genus "maleic acid derivatives" from the Markush group at Col. 5, lines 43 to 58. According to MPEP 2144.08 "The fact that a claimed species or subspecies is encompassed by a prior art genus is not sufficient by itself to establish a prima facie case of obviousness." Furthermore, the guidelines state that "The prior art must provide one of ordinary skill in the art the motivation to make the proposed molecular modifications." Scherber et al. disclose maleic acid derivatives, but they do not disclose or suggest the use of polymaleic acid for a barrier slurry.

The rejection then combines the (1) bulk copper, (2) first copper CMP and (3) barrier slurries of Sun et al. and complexing agent genus (4) of Scherber et al. with polymaleic acid polymer literature (5) to form the rejection. The genus maleic acid derivative encompasses thousands and thousands of molecules. From the genus of thousands and thousands of molecules, the action selects polymaleic acid polymers without any motivation to substitute the polymaleic acid polymers into a barrier polishing slurry. In addition, as stated in the earlier-submitted Declaration of Dr. Liu, Scherber et al. teach the use of organic acid as chelating agents

and that polymerizing the chelating agent reduces its efficiency. Thus, since polymerizing polymaleic acid reduces the chelating efficiency of polymaleic acid to those skilled in the art, Scherber et al. teach away from the combined references.

Thus, since there is no motivation to combine the bulk copper slurry of Sun et al. with the first copper CMP and barrier removal slurry of Sun et al., Sun et al. teach away from using a pH less than 4 for barrier polishing, there is no motivation to combine with the maleic acid derivative genus of Scherber et al, there is no motivation to select polymaleic acid from the maleic acid derivative of Scherber et al. and Scherber et al. teach maleic acid chelating agent--that in turn teaches away from the use of "polymaleic acid" to those skilled in the art, Applicant respectfully submits that the combined references fail to disclose or suggest the claims, as amended.

With respect to claim 4, Sun et al. at Col. 7, lines 53 to 59 do disclose a pH range of 2.5 to 11. But this range is for the first-step copper CMP slurry that removes copper with a reducing agent. This teaches away from the claimed invention that requires the use of an oxidizer.

With respect to claim 5, Sun et al. combine a bulk copper with a barrier slurry that is counter intuitive to those skilled in the art; fail to teach the pH range for a barrier slurry; teaches away by having the preferred barrier slurry operate with a basic pH; and the reference fails to disclose the claimed range for water soluble polymaleic acid.

Applicant respectfully submits that the amended claims are in proper form for allowance and respectfully request reconsideration. In addition, if the USPTO elects to maintain the

rejection, Applicant request entering the amendment to claim 5 for purposes of appeal. If a telephone call would expedite prosecution, please call me at 302 283-2136.

Respectfully submitted,

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Date

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